stone casing, and the falling of the parts of the roof, by straining at its joints, has been partially remedied by screwing up and repairs.

In the violent papers upon architecture in the *Catholic Dublin Review*, every thing is shewn with the most childish reversal of genuine Freemasonry; flying buttresses are generally omitted, and the whole construction, as shewn thereby, is the weakest and most absurd, and that which is the most diametrically opposed to genuine architectic art, while not a few of the mere surface-parts of the designs are highly exceptionable.

Freemasonry being in so comparatively lost a state, as we have already hinted, the observations which we have made must necessarily be most imperfect; they are rather directed with the view of exciting inquiry than with the object of teaching any one. Most of these imperfect notions have come intuitively to us, for there is not at present any treatise upon Freemasonry: when we have such a treatise, the system of church-building will be entirely altered; canons for every thing will be established; centres for the best or the most intricate vaults may be kept ready-made; for the same centres may serve for churches of the same size, and thus one of the heaviest parts of the expense of vaulting will be saved. All the rules of the Church-building Society will be altered and improved, many of them being at present most objectionable, more particularly the late alterations relative to the construction of churches.

NEW BUILDING-ACT.

A meeting of the Master Carpenters will be held on Wednesday, the 25th instant, at the Freemasons' Tavern; when the final report upon the new Building-Act will be laid before the meeting. We shall endeavour to place this before our subscribers on the first opportunity.

MINERALOGY.

BY HENRY G. MONTAGUE, ESQ., PROFESSOR OF NATURAL PHILOSOPHY.

(*Continued from p.* 467.)

The microscopical discoveries of Ehrenbergh have contributed to establish the identity of chalk with animal organizations, but, like all microscopic observers, he falls into many strange errors and inconsistences, and by generalizing too much, sometimes throws a doubt upon the whole of his purported discoveries. That much of the chalk consists almost solely of the caripaces of animalculæ cannot be questioned, and it was to this organic origin of chalk I first drew the attention of this learned professor while making his philosophical observations in Egypt and Nubia: but, he evidently confounds the cellular structure of the animalculæ with the cellular structure of all calcareous animals; for all polypes, molluscs, and crustacea have a cellular structure, all are convertible into chalk, and all, under the form of chalk, microscopically present the cellular structure to our observation. That he is mistaken when he speaks of the vast peat mosses, twenty-three miles from Berlin, as being composed of animalculæ to the extent of thirty or forty feet in thickness, is evidenced by the fact, that these lower beds chiefly consist of decayed fuci, as is testified by Humboldt and Van Buch, and the former found the Fucus Sacharinus in inner peat moss from 8 to 10 inches in length, and from 1 to 1½ inches in breadth, as fresh and uncorrupted as they are found in the sea at Heligoland: the latter writer also observes, that in the vicinity of Drontheim, the flat peninsula of Cereland consists also of a great peat bed, of which the undermost strata are composed almost entirely of half-decayed marine plants, the long leaves of zostera and others. It is true that, together with the decayed fuci of earth of marine plants, the reliquæ of animalculæ abound, and that their internal arrangements can be made visible by the process adopted of feeding them with colouring substances; but it is equally true that he has mistaken the cellular structure of fuci, actiniæ, &c., for distinct animalculæ.

The calcareous deposits disposed beneath the tropics, both beneath and above the waters, answer exactly to the chalk formations of Great Britain, and present the like variations, evidently proceeding from like local causes: the ocean marle so commonly observed in the West Indies is also of like composition and character, being a true chalk, with which is blended masses of living fuci and animal species, and the organic remains of each. In all parts of the world, where the causes of effects are in active operation, an uniform sequence of events takes place, beginning with life, and ending in the various products forming the fossil and mineral kingdom. Several writers have supposed that this marl or chalky substance, so commonly constituting extensive beds of tropical seas, is produced by the digestive processes of animals; and this indeed is partly the case, as vegetable earth is sometimes formed by the like processes, but a great portion of it is the product of animal and vegetable decomposition.

In the ocean it is a kind of chalk, variably united with sands, marine bodies, and seawater; but these vast beds, as they gradually become elevated above the waters, so they undergo changes in conformity to their nature, local associations, and local influence. Thus, some of the calcareous groups consolidate as limestone, others decompose, and acting and being acted upon by surrounding bodies, undergo individual or general changes. Take for instance the phenomena of the Red Sea, the chains of mountains surrounding it, and intersecting Arabia, the deserts of Nubia, Egypt, and other great wastes of Africa, together with the vast forming reefs and islands of that sea: in one place we observe the coral in every stage of decomposition, pass gradually into various mineral forms, as sulphate, muriate and carbonate of lime, silica, bituminous limestone, siderite, jasper, &c.; in another, changes are more uniform and circumscribed. Some of the coral islands consist almost wholly of limestone rock, presenting various states of induration, others consist of the comminuted particles of shell-fish and reliquæ of testacea gradually converting or already converted into silicious bodies, disunited, or in aggregate masses, as the accident of combination may determine; beaches of the sea are wholly composed of the shells, sands, and particles recently thrown up by the waves; but vast hill and mountain masses wholly consist of carbonate or sulphate of lime —the carbonate as chalk, the sulphate as gypsum.

In the midst of deserts 100 or 200 miles from the sea, the limestone, calcareous, and chalk ranges are found covering the plains to a great depth, or otherwise forming hill and even mountain chain of considerable extent. The hills marking out the boundaries of Egypt are sometimes wholly composed of chalk and marine exuviæ, sometimes stratified with alternate layers of chalk and petrified shells, analogous in form and composition to the stratified beds of chalk and flint in this country. Sometimes the matrix of decomposed coral forms a soft carbonate of lime, and the enclosed shell-fish are seen passing, by the slow process of decomposition, into chalk. In all countries the causes and effects are precisely alike so far as regards the primary origin of these beds; but the after changes depend for the form they may assume upon local affections. In America the chalk formations have passed into the state of bituminous and other limestones, or varieties of sulphate of lime; in England, where there is less heat and a greater degree of moisture than in tropical lands, the matrix of soft carbonate of lime passes into the state of chalk, and the nodulates or organic reliquæ inclosed pass into FLINT. If in chalk aggregates the carbonic acid be displaced by sulphuric acid, it becomes gradually converted into GYPSUM, other deviations exhibit alabaster and other crystalline marble, anhydrous selenite, &c.

Gypsum or selenite, otherwise termed sulphate of lime, is very extensively disseminated through the upper beds of the earth under a variety of forms and combinations, being in general most abundant in close proximity to salt beds. Of this genus, two species are known, viz. the *prismatic* and the *axefrangible*, the first being divided into four sub-species, the latter into six sub-species. Sulphate of lime is produced under particular local influences, and however extensively disseminated, the local causes of effects produced strongly similate to each other.

After the changes above explained, the oceanic earths, upon being exposed to long continuous vertical heat in regions where it seldom or never rains, become oxydated, or, as it is termed by some chemists, burnt, by which process they lose some of their primary constituents, permanently combine or neutralize with others, and dispose the oxydated mass to unite withthe gases and vaporous exhalations which pass through it from the inner beds, or are absorbed from the atmosphere. One of the most common exhalations in hot, dry regions and virgin lands is sulphureted hydrogen, and lime uniting with this gaseous compound, a fixed and permanent result is produced termed ANAHEDRITE. Again, where hydrogen is present in greater quantities, a triple compound is the result, known as SELENITE or SPARRY GYPSUM. Sometimes sulphureted hydrogen or sulphurous gas passes through the dry calcareous beds, and the chemical action consequent on this intrusion gives birth to rock gypsum in its varieties.

It is generally supposed, nay it is taken for granted, that all the varieties of limestone are formed under great lateral pressure; but the facts elicited from Nature by observation give the decided negative to this theoretic idea. The change from chalk into marble is produced by simultaneous expansion of its particles produced by chemical action, and this change almost invariably takes place in beds very superficially disposed upon or within the surface of the earth. The formed crystal increases and cohesion of the particles takes place by infiltration, and the more exposed a bed of earth is to atmospheric influences, the harder the rock becomes; this is the very reverse to the process of lateral pressure. Jaspers and petrifactions of the desert are much harder than flints in the British strata. The high crystalline structure of all rocks depends upon the extent of their exposure to atmospheric heat, and such is the law governing natural cements. Thus sands and gravel cohere and form breccia, and breccia exposed to atmospheric influences becomes converted into gneiss, granite, &c.; in no one instance do we find them subject to lateral pressure during the progress of change.

Lime has the tendency at all times to assume the form of chalk, having a great affinity for carbon, and absorbing it rapidly from the atmosphere as well as from the contiguous beds; for this reason it is that carbonate of lime is more extensively distributed over the calcareous regions and diverges into more numerous varieties than any other class of earths.

The after changes of an organic body, or a group of calcareous animals, excites at once our wonder and admiration; embedded in ocean marl, they may decompose, and become identified as one with the marl, or uniting with other aggregate masses, their identity be lost in enormous masses of rock. Elevated above the element which gave them birth, they are preserved from decomposition by the salts left by evaporated waters, and they enter the petrified state, passing from thence into the form of jasper, agate, opal carnelion, or some other product. Decomposing in the midst of the calcareous bed, they pass from the organic state into chalk, from thence into flint, or some other mineralized substance; they sometimes contribute to give variety and beauty to marbles, porphyries, and other precious stones; sometimes they mineralize, still retaining their form as a metalline substance. Again, the body may pass through other organic systems, contributing by this means to the increase and spread of life; or decomposing, it may destroy and become the grave of the living.

In Egypt, the hills have generally a matrix of soft limestone, and the fossils are converting or converted into chalk; in England, the matrix, permeated by waters, impregnated with carbonic acid, becomes converted from soft limestone into chalk, and the chalk nodules silicify as flints; in all these changes we observe traces of a beginning, and causes and effects, and effects and causes, succeeding each other; but we cannot dive into